

Ecology of the Broom Crowberry (*Corema conradii*) a Pine Barren Perennial



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Introduction

Conrad's Broom-Crowberry (*Corema conradii*) is found in both the meadow and forest habitats of the New Jersey Pine Barrens. The Crowberry grows best in well-drained soils with an acidic pH. Wild fires have a significant effect on the growth of its native wild life. Pine barren habitats are subject to frequent wildfires, however the meadow habitat is burned annually as part of the management of the Pine Barrens wilderness.

Hypotheses

1. The meadow being the most recently burned habitat in the Pine Barrens, is expected to exhibit a soil with a low water concentration and an acidic pH.
2. The average diameter and area of the Conrad's Broom-Crowberry (*Corema conradii*) plants found in the meadow habitat will be larger than those found in the undisturbed forest.

Methods

1. Randomly select three Crowberry plants in each habitat.
2. Collect 50 g of the soil from under each plant and determine the average height, diameter, and area using the equation “area = πr^2 ”.
3. Determine the water concentration, and pH of the soil samples. The water concentration of each soil sample was determined by taking the initial weight once collected then placing the soil in an autoclave oven at 42°C for 48 hours before weighing the sample again in order to determine how much water evaporated. The pH of the soils were determined by placing the soil in a 1:1 ratio with deionized water for 24 hours before using a Lab Quest to read the pH.
4. Linear regressions and t-tests using the software, JMP 10, SAS Institute Inc. were used to analyze the results.

Meadow



Forrest

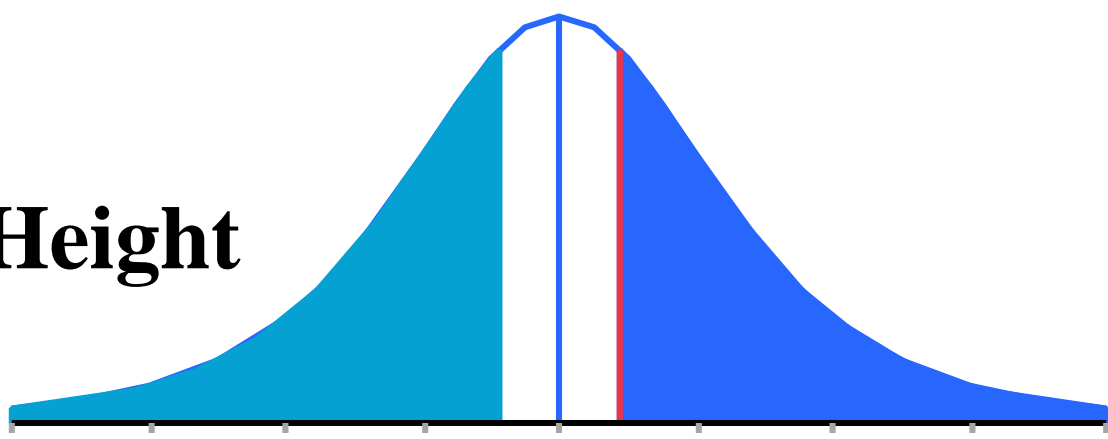


Results

After successfully locating 3 random Crowberry plants in the meadow and 3 in the forest of the Pine Barrens the data was calculated. It was determined that the average water concentration in the meadow was 2.56 mL with an average pH of 5 while the average water concentration in the forest was 3.20 mL with an average pH of 5.22. The average height of the Crowberry plants in the meadow was 6.61 in with an average area of 324.37 in² and average diameter of 20.17 in. The average height of the Crowberry plants in the forest was 6.38 in with an average area of 151.17 in² and average diameter of 13.48 in.

T-test Analysis of Meadow vs. Forest

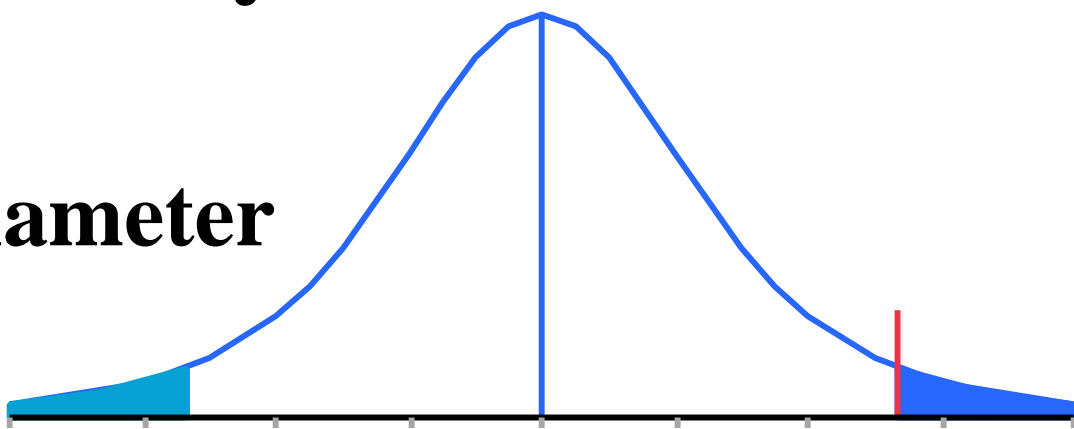
Height



Prob > t 0.3627

Since the Prob > t is greater than 0.05, there is NOT a significant difference between height in the meadow and forest.

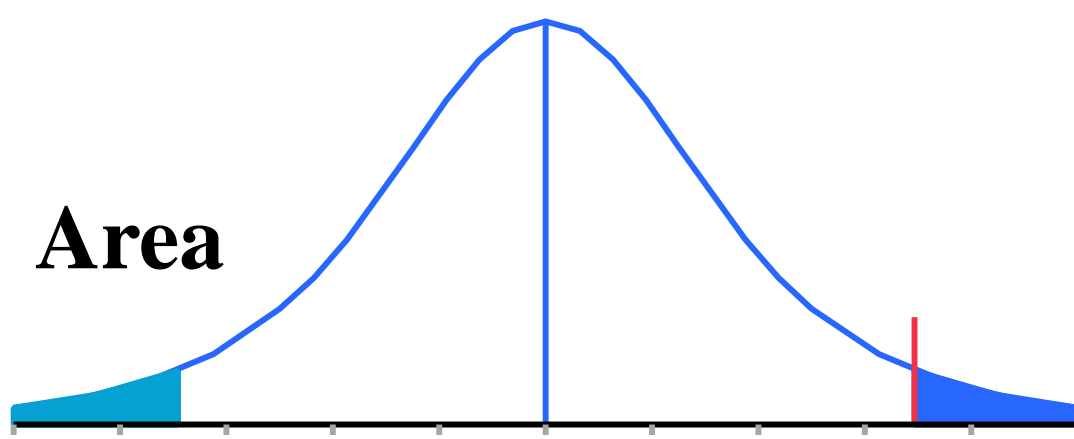
Diameter



Prob > t 0.0413

Since the Prob > t is less than 0.05, there is a significant difference between diameter in the meadow and forest.

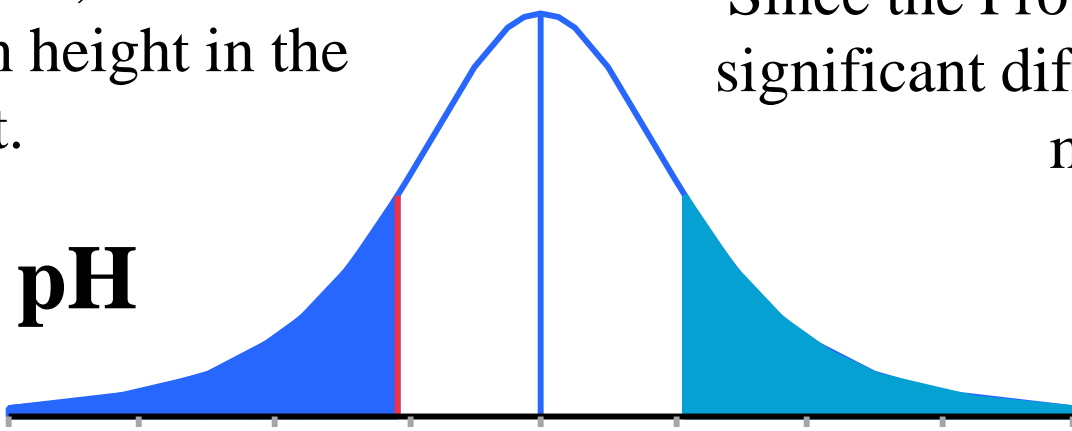
Area



Prob > t 0.0445

Since the Prob > t is less than 0.05, there is a significant difference between area in the meadow and forest.

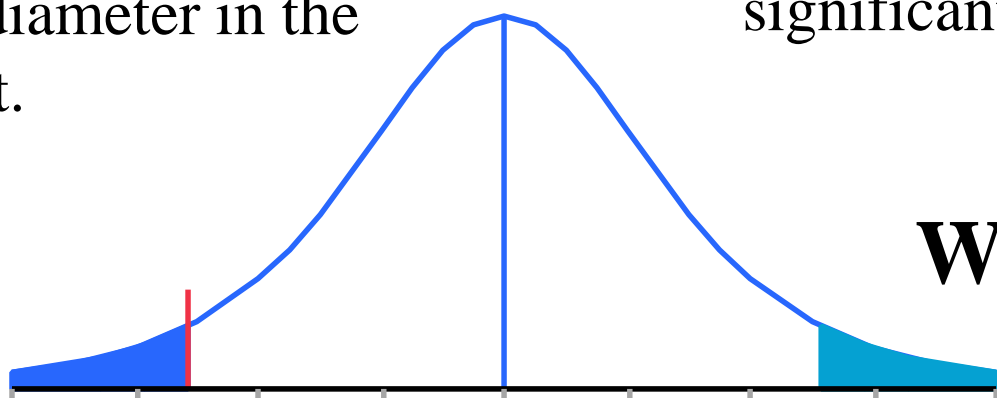
pH



Prob > t 0.8231

Since the Prob > t is greater than 0.05, there is NOT a significant difference between pH in the meadow and forest.

Water Concentration

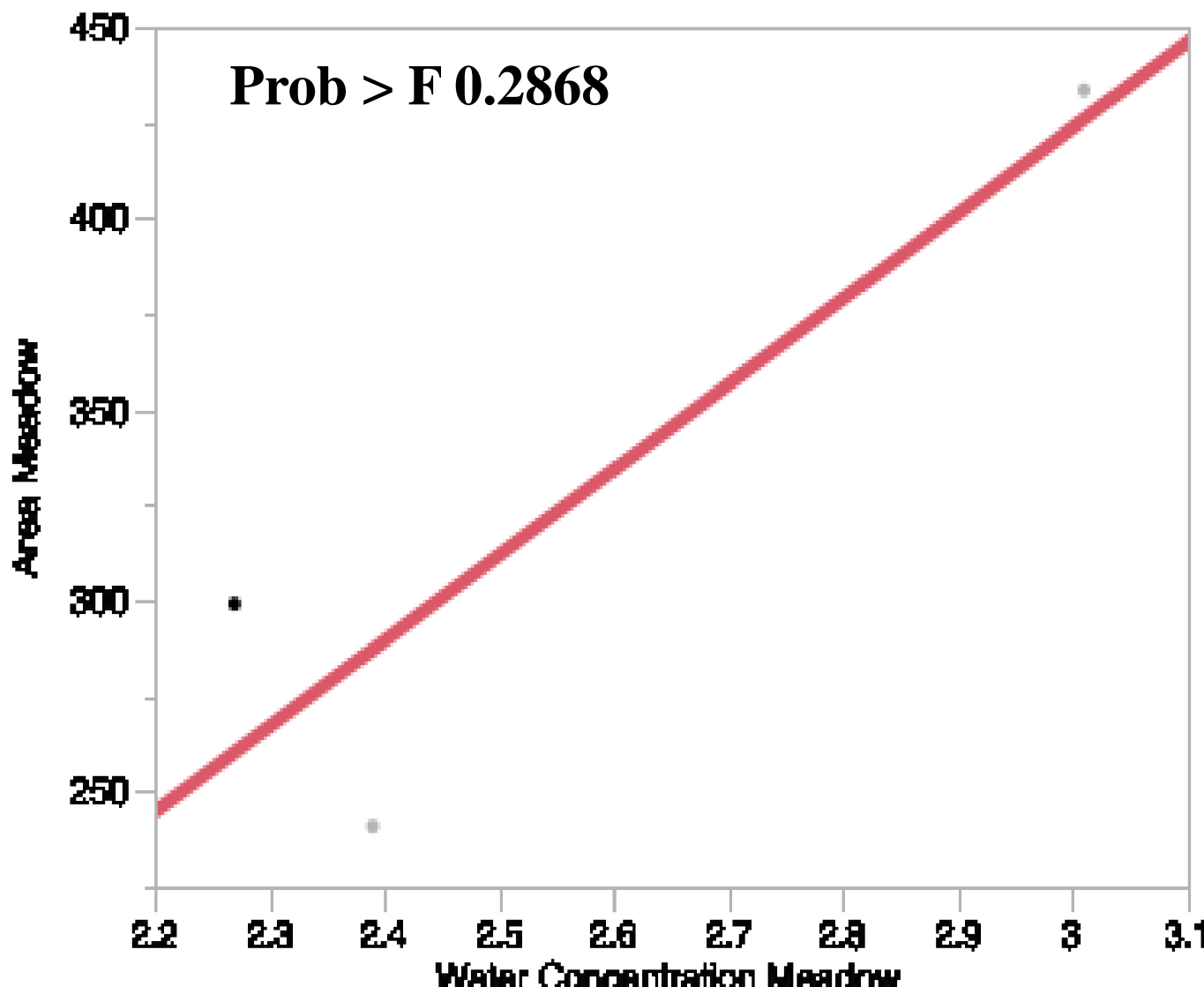


Prob > t 0.9449

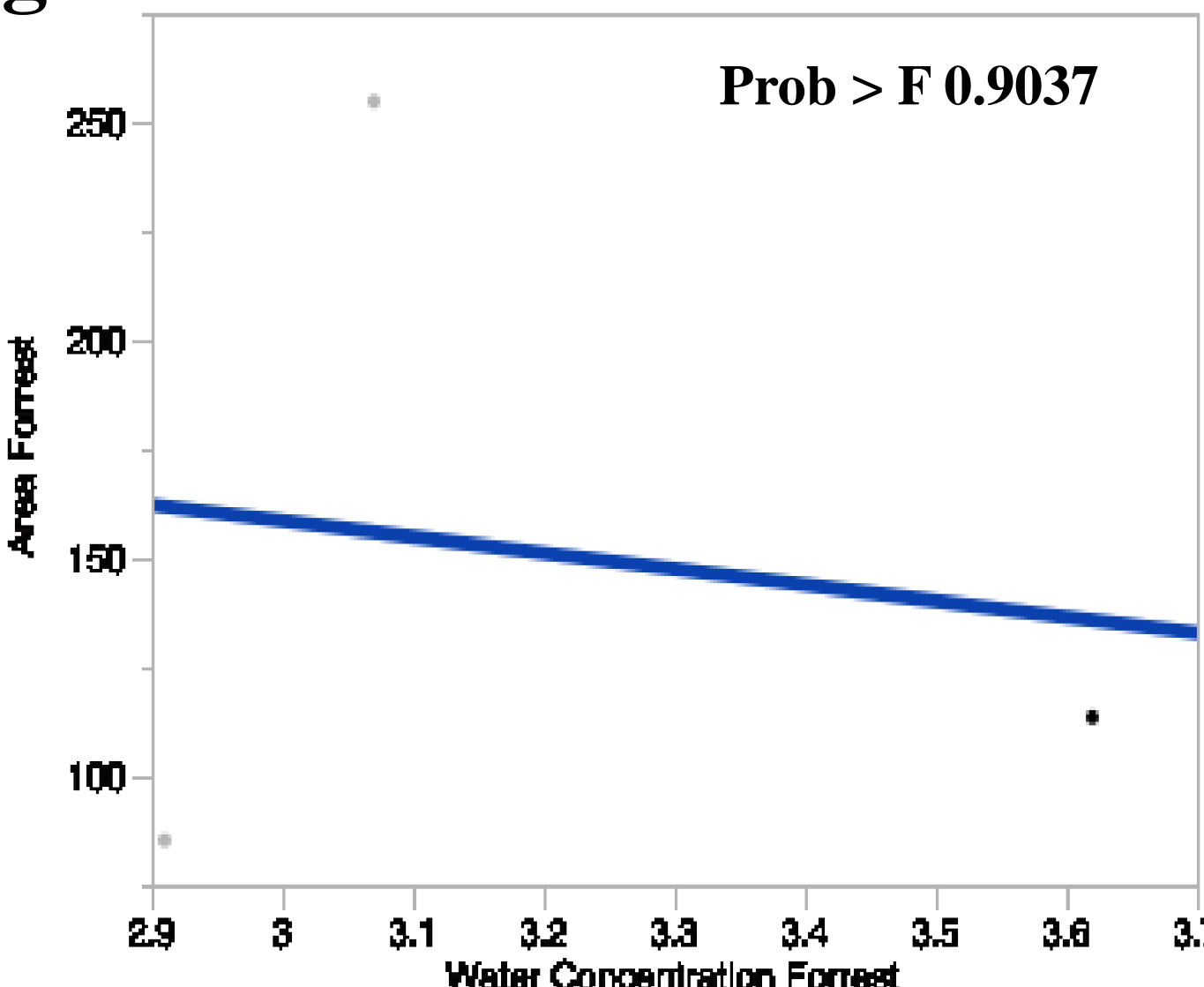
Since the Prob > t is greater than 0.05, there is NOT a significant difference between water concentration in the meadow and forest.

Linear Regression

Since the Prob > F is greater than 0.05, there is a strong relation between these two variables. For every mL of water increased, the average area increased 223.88 in².



Area Meadow = -248.0041 + 223.87698*[Water]



Area Forrest = 268.69694 - 36.727984*[Water]

Since the Prob > F is greater than 0.05, there is a strong relation between these two variables. For every mL of water increased, the average area decreased -36.73 in².

Conclusion

After analyzing the results, it was determined that the first hypothesis tested must be rejected since there is not a significant difference between the pH of soil and there was also a higher water concentration in the meadow compared to the forest. The second hypothesis tested however, will fail to be rejected since there was a significant difference determined in the average diameter and area of the Conrad's Broom-Crowberry (*Corema conradii*) plants found in the meadow habitat compared to those found in the undisturbed forest. The plants in the meadow seem to grow larger primarily due to the increased amount of water available in the soil. This concludes that the average plant size in the forest was most likely limited by an additional factor not tested in this study such as the amount of available sunlight.

Acknowledgements

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